Impact of COVID-19 related lockdown on hospital admissions, hospital burden and deaths due to non-COVID illnesses in a tertiary care centre in Southern Sri Lanka

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Abstract

Background: Sri Lanka imposed an aggressive curfew to prevent the spread of COVID-19, which led to major changes in population behaviour. It was presumed that these measures could affect the morbidity patterns and management of other medical conditions. We aimed to study the impact of the pandemic on hospital admissions, morbidity patterns and mortality from non-COVID illnesses during the period of lockdown.

Methods: A retrospective study was conducted to gather data related to all non-COVID medical admissions from four medical wards and emergency treatment unit (ETU) of the Teaching Hospital Karapitiya for a six-week period during the lockdown. Data on the total number of admissions, reasons for admission, diagnoses, duration of hospital stay and outcome including deaths were obtained. Corresponding data from the same period of the previous year (pre COVID period) were compared.

Results: The total number of admissions during the pre- COVID period was 2939 and that reduced to 1491 during the lockdown period. There was a significant reduction of admissions due to infectious illnesses including respiratory tract infections (p <0.001), dengue (p= 0.01) and leptospirosis (p=0.02) during the lockdown period. There was a significant increase in requested admissions (p=0.002) including admissions for procedures, investigations, referrals and transfers. The mortality during the two periods did not change significantly (pre-covid period 5.1 % , lockdown period 4.2%, p=0.16).

Conclusions: The results of the study showed that social distancing and travel restriction had a significant impact on health seeking behaviour, disease patterns and outcome. Reduction in hospital admissions and changes in disease patterns, especially reduction in respiratory tract infections could be a positive effect of preventive measures: physical distancing, wearing masks and travel restriction. Total lockdown of the country had no significant effect on total deaths as well as deaths related to NCDs.

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Key words: COVID-19, lockdown, hospital burden, non-COVID-medical admissions

Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (1). It is one of the worst pandemics faced by humankind in recent history. COVID 19 was first identified in December 2019 in Wuhan, China and has since spread globally, affecting almost all the countries in the world (2). Due to the exponential rise of cases in most countries in the globe, the World Health Organisation (WHO) declared COVID-19 as a pandemic on 11th March 2020 (2, 3). The current management of COVID-19 is largely supportive, with respiratory support for those who develop COVID-19 related acute respiratory distress syndrome (ARDS). As there is no definitive therapy for most patients with COVID -19, almost all countries have used aggressive public health measures to control the spread of the disease especially at the beginning of the outbreak. These measures relied heavily on massive mobility restrictions, and household-focused social distancing (4, 5,6).

In Sri Lanka public health measures to prevent community epidemics were quickly implemented and a lockdown styled curfew was imposed on 20th March 2020 in order to achieve social distancing. Since then, there have been major changes in population behaviour (7, 8). Available data suggest that the rise in the number of COVID-19 cases during early pandemic was accompanied by a decline in non-COVID-19 hospital admissions (3,4,7). Fear of having COVID (COVID phobia) and travel restriction are considered to be the main reasons for the decline in non-COVID-19 hospital admissions . The Ministry of Health also actively discouraged patients to attend public sector outpatient clinics and shut down all private outpatient clinics in order to achieve social distancing. A novel mechanism was introduced by the government to deliver the routine medications via post and patients were encouraged to continue their routine medications without visiting a doctor.

As a result of the above factors, there was a belief that morbidity and mortality related to non-COVID illnesses such as NCDs would increase during the period of mobility restrictions and social distancing (10). The latter could also have a favourable impact and decrease the incidence of other infectious diseases (11,12,13). Furthermore, understanding how morbidity and mortality changed during the period of social distancing and lockdown is useful for future policy making.

Therefore, we aimed to study the impact of the pandemic on non-COVID-19 hospital admissions and the morbidity and mortality of non-COVID patients during the period of lockdown. Sri Lanka has not previously experienced a period of social distancing, and the current necessity for social distancing is likely to continue until the pandemic is well controlled globally. Therefore, understanding how morbidity and mortality of non-COVID illnesses change during the period of social distancing and lockdown is useful for future policy making.

Methods

Study Method and design: "This study was conducted as a retrospective study. Data related to hospital admissions of all adult patients with non-COVID 19 medical illnesses to the ETU and four medical wards of the Teaching Hospital, Karapitiya (THK) were collected and analysed." The hospital records (admission registration books and the bed head tickets) of all patients admitted to the above units from 20th March to 3rd May, 2020 were used to extract data. Following data were obtained; socio-demographic factors (age, gender, race), presenting symptoms, diagnoses, duration of hospital stay, laboratory investigations, management and the outcome of the illness (discharge, transfer to other facilities/ICU, in-hospital mortality and causes of death). The patients' presenting complaints were classified into respiratory and non-respiratory. If not indicated in the individual case notes, that information was considered to be absent in that particular patient. Corresponding data was taken for the same period of the previous year (20th March to 3rd May, 2019) using the same method for comparison (pre -COVID period).

Statistical Analysis: The data was analysed using

the Statistical Package for the Social Sciences (SPSS) software version 24.0. Continuous variables were summarised using mean, median and interquartile range (IQR) values and categorical variables were described as frequency rates and percentages. Means for continuous variables were compared using independent group t tests when the data were normally distributed; otherwise, the Mann-Whitney test was used. Independent samples t-test was used to detect significant differences between pre-COVID and COVID periods.

Results

The total number of admissions during the pre-COVID period (2019) was 2939 and it decreased to 1491 during the lockdown period. This corresponds to a reduction of 49% of admissions during the lockdown period compared to pre-COVID period. Table 1 shows the baseline characteristics of the patients admitted during pre-COVID and lockdown periods. There were no significant differences between the two groups with regard to gender and the ethnicity; however, during the lockdown period the patients who got admitted were significantly younger than pre-COVID period and there was a significant drop of hospital admissions among individuals over 60 years of age.

There was a significant reduction of admissions due to respiratory tract infections (*p=<0.001*) , dengue (p=0.01) and leptospirosis *(p=0.02*) during the lockdown period (Table 2). Significantly higher requested admissions (*p=0.002*) were observed in the lockdown period including admissions for procedures, investigations, referrals and transfers. Interestingly, the proportion of admissions due to non-communicable diseases including acute coronary syndrome (ACS), stroke and diabetes mellitus did not change in the two periods. Requested admissions and chronic kidney disease (CKD) related admissions were the commonest causes of admissions during both pre-COVID and lockdown periods. Respiratory tract infections, dengue, Ischemic heart disease or related diseases and UTI/unclassified febrile illnesses were the other leading causes of admissions during both pre-COVID and lockdown periods.

Table 1 - Baseline characteristics of the patients admitted during pre-COVID and lockdown periods

	Admissions in pre-COVID period (20^{th} March to 3^{rd} May, 2019)	Admissions in Lock down period (20^{th} March to 3^{rd} May, 2020)	P
Total	2939	1491	
Male Gender	1739 (59%)	894 (60%)	0.08
Mean (SD) age in years	54.24 (14.2)	52.13 (15.3)	<0.001
Age group			
<40 years	617 (21%)	358 (24%)	0.02
40-59 years	1263(43%)	865 (58%)	<0.001
>60 years	1059 (36%)	268 (18%)	0.01
Ethnicity-Sinhalese	2634 (88.7%)	1297 (86.9%)	0.08
Duration of hospital stay (days)	3.4	2.9	0.01

Data are presented as mean±SD or as percentages. Between-groups analysis is by analysis of variance or by χ2 for scale or categorical variables, respectively.

Table 2 - Hospital admission due to various illnesses during lockdown and pre-COVID periods

	Admissions in pre-COVId period (20th March to 3rd May, 2019)	Admissions in Lock down period (20th March to 3rd May, 2020)	P
Respiratory infections (pneumonia, acute bronchitis, lung abscess)	338 (11.5%)	102 (6.8%)	<0.001
Exacerbation of asthma or COPD	210 (7.1%)	103 (6.9%)	0.4
Dengue	195 (6.6%)	54 (3.8%)	0.01
Leptospirosis	48 (1.6%)	12 (0.8)	0.02
Urinary tract infection/ other unclassified febrile illnesses	176 (5.9%)	68 (4.2%)	0.09
Stroke /TIA	42 (1.6%)	24 (1.6%)	0.1
Acute myocardial infarction /Angina /heart failure	156 (5.3%)	64 (4.2%)	0.1
Diabetes mellitus or related admissions	139 (4.7%)	67 (4.2%)	0.1
CKD related admissions	456 (15.5%)	257 (17%)	0.07
Requested admission	453 (15.4%)	410 (27.4%)	0.002
miscellaneous/unspecified/absent	687 (23.4%)	332 (22.2%)	0.2

Table 3 - Outcome of patients admitted during pre-COVID and lockdown periods

	Pre-covid	**lockdown period**	**P**
Total admissions	2939	1491	
Total deaths	5.1% (152)	4.2 % (63)	0.16
Transfer to ICU/other facilities	0.9%(29)	0.9% (14)	0.87
Deaths due to respiratory infections –pneumonia, exacerbation of COPD, bronchiectasis	2.3 %(69)	2.8% (42)	0.89
Deaths related to ACS	1.0% (32)	1.2 % (19)	0.58
CKD/ related deaths	1.6% (49)	2.4% (36)	0.08

As seen in Table 3, there is no significant difference in mortality rates between the two periods. Specially, there is no significant rise in mortality among patients with acute coronary syndrome and CKD. Leading cause of death during both pre-COVID and lockdown periods was infections.

Discussion

The major findings of this retrospective study were: (a) a significant reduction in medical hospital admissions during lockdown period compared to pre-COVID period; (b) a significantly lower total duration of hospital stay during lockdown period; (c) a significant reduction of hospital admission due to infectious illnesses (respiratory tract infections, dengue and leptospirosis) during the lockdown period with no significant changes of NCD related hospital admissions (d) a significant change in overall mortality as well as disease related mortality in lockdown period. We also found that the patients who got admitted during the lockdown period were significantly younger.

Our findings of reduction of hospital admissions during lockdown period are comparable with those published in the literature (14-21). A study conducted by Kapsner et al showed that overall in-patient hospital admissions in Germany decreased by 35% during the lockdown period compared to the year 2018 (15). Caminiti et al found a reduction of around one third of the non-COVID admissions in Italy in 2020 vs 2019 (16). Kuhlen et al found a decrease of 42.7% in non-COVID hospital admissions during the lockdown period compared to 2019 (20). The decline of hospital admissions implies that the travel restrictions imposed by the government have limited patients accessing health care facilities during the lockdown period. In addition, fear of acquiring COVID-19 may have made the patients reluctant to access government hospitals.

We found a change in the demographic characteristics of the patients admitted to hospital during the lockdown period. While there was a significant reduction of hospital admission of patients over 60 years, there was a significant increment of proportion of patients admitted in the age group of 40-60 years. These observed changes could be due to a number of factors that are more likely to affect the elderly individuals than younger people; for example, mandatory restrictions on movements due to lockdown, fear of being infected and inability to pay for transport due to lost income.

There was also a reduction of hospital admissions due to infectious diseases such as respiratory tract infections, dengue and leptospirosis during the lockdown period while there was no significant change in hospital admission from NCDs. Although the identification of the reasons for such changes in disease patterns during lockdown period are beyond the scope of this study, we speculate that a number of factors may have played a role. A significant reduction in respiratory tract infections could be a result of wearing masks, frequent hand washing and social distancing, limiting the spread of infections in the community (22). It could be also due to the reluctance among the public to seek hospital treatment for minor respiratory symptoms that could have been relieved with simple home remedies for respiratory symptoms. The finding of our study was somewhat different to the published literature. One of the Sri Lankan studies based on the nationwide epidemiological data showed reduced dengue cases, but higher leptospirosis cases (23).

It was expected to see a surge of patients with NCDs coming to hospitals with acute illnesses with the closing down of all regular outpatient healthcare services including private and specialised clinics. However, our study did not find such a rise of NCD related admissions. A number of positive and negative factors may have influenced or balanced the NCD related hospital admissions. Relatively stress free lifestyle due to lockdown, alteration of food habits, and possible increased compliance with medication leading to better control of NCDs may have played a positive role. Factors such as poor access to health care facilities and the general reluctance to admit to hospital until the illnesses get worse can have a negative effect on NCD control and subsequent

NCD related admission. Many previous studies have shown that admissions related to NCDs reduced during lockdown. A study conducted by Stohr et al. [24], reported a 20% overall decline in cardiovascular admissions from January to April 2020 vs the same period in 2019 and this study showed that this decline was mainly driven by a reduction in "discretionary admissions", while "unavoidable admissions" were unchanged.

Our findings relating to requested admissions deserve specific consideration. It is noteworthy that during the period of lockdown, the private health sector was relatively shut down due to the government policies and the peripheral hospitals promptly transferred patients who needed critical care to tertiary care hospitals. As this study was conducted in the only teaching hospital in Southern Province, the significant rise in the requested admissions could have been due to increased referrals, transfers, investigations and other procedures, which could not be fulfilled by private sector or other hospitals.

This study showed that mortality rates did not significantly increase during the lockdown period for both infective as well as non-infective illnesses such as ACS and stroke. This is an interesting finding as some studies conducted in different settings have shown higher mortality of patients with non-COVID illnesses (10,26)

This study has some limitations. Firstly, data were taken from hospital records (admission books, bedhead tickets, and discharge books) which may result in information bias. Secondly, our study was conducted as a single-centre study, involving only four medical units and an emergency treatment unit (ETU); therefore, our results may not be directly comparable to other hospital setups. Finally, our study compared its data with data obtained corresponding to the same period of the previous year. As the same period of the previous year was affected by the unfortunate Easter terrorist attack, results would have been more valid if the comparison was made for a longer period.

Conclusions

The results of the study showed that social distancing and travel restriction had a significant impact on health seeking behaviour, disease patterns and outcomes in a Sri Lankan tertiary care unit. Reduction of hospital admissions, and changes in disease patterns, especially reduction of respiratory tract infections could be a positive effect of social distancing and travel restriction.

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